

Appl. No. 10/807,207  
Amdt. dated March 7, 2005  
Reply to Office Action of November 9, 2004

PATENT

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method for communicating a radio frequency (RF) signal, comprising:  
generating an interleaved baseband signal by selectively interchanging a routing of a plurality of baseband signals according to an interleaver operation;  
mixing a the interleaved baseband signal with a plurality of oscillator signals with different phases in an interleaving manner, the interleaving manner related to the interleaver operation; and  
communicating the mixed baseband signal as an the RF signal.
2. (Original) The method as recited in claim 1, wherein the method is carried out by a transmitter.
3. (Original) The method as recited in claim 1, wherein the oscillator signals include an oscillator signal frequency substantially equal to an RF signal frequency of the RF signal.
4. (Canceled)
5. (Original) The method as recited in claim 1, wherein the oscillator signals have phase differences of 0, 90, 180, and 270 degrees.
6. (Original) The method as recited in claim 1, wherein the mixing is carried out by a plurality of mixers.
7. (Original) The method as recited in claim 6, wherein the oscillator signals are input to the mixers in the interleaving manner.
8. (Original) The method as recited in claim 7, wherein the oscillator signals are input to the mixers in the interleaving manner by switching which oscillator signals are input to which mixers.

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9. (Currently Amended) The method as recited in claim 8, A method for communicating a radio frequency (RF) signal, comprising:  
mixing, using a plurality of mixers, a baseband signal with a plurality of oscillator signals with different phases in an interleaving manner, wherein the oscillator signals are input to the plurality of mixers in the interleaving manner by switching which of the plurality of oscillator signals are input to which mixers, and wherein the switching occurs at a rate that is faster than a bandwidth of the RF signal; and  
communicating the mixed baseband signal as the RF signal.

10. (Currently Amended) The method as recited in claim 9, wherein the switching occurs in a substantially random manner.

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Currently Amended) The method as recited in claim 1, wherein ~~a~~ the plurality of ~~the~~ baseband signals is provided including an in-phase baseband signal and a quadrature baseband signal.

15. (Currently Amended) A subsystem for transmitting a radio frequency (RF) signal, comprising:

means for mixing a baseband signal with a plurality of oscillator signals with different phases in an interleaving manner; and

means for transmitting the mixed baseband signal as ~~an~~ the RF signal.

16. (Original) A subsystem for transmitting a radio frequency (RF) signal, comprising: at least one mixer for mixing a baseband signal with a plurality of oscillator signals with different phases in an interleaving manner.

17. (Currently Amended) A system, comprising:

a mobile device in communication with a wireless communication network;

wherein the mobile device includes an integrated circuit including:

at least one mixer for mixing a baseband signal with a plurality of oscillator signals with different phases in an interleaving manner.

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18. (New) A method of quadrature balancing and Local Oscillator (LO) feedthrough suppression, the method comprising:

selectively interchanging a routing of an in-phase (I) baseband signal and a quadrature (Q) baseband signal according to an interleaving operation to generate a first interleaved I and Q baseband signal and a second interleaved I and Q baseband signal;

frequency converting the first and second interleaved I and Q baseband signals to first and second RF signals, respectively, using a plurality of oscillator signals with different phases, the different phases of the plurality of oscillator signals based in part on the interleaving operation; and

combining the first and second RF signals.

19. (New) An apparatus for quadrature balancing and Local Oscillator (LO) feedthrough suppression of a transmit signal, the apparatus comprising:

a baseband interleaver configured to receive an in-phase (I) baseband signal and a quadrature (Q) baseband signal and generate a first interleave signal at a first output by selectively routing the I baseband signal to the first output during a first time interval and selectively routing the Q baseband signal to the first output during a second time interval, and generate a second interleaved signal at a second output by selectively routing the Q baseband signal to the second output during the first time interval and selectively routing the I baseband signal to the second output during the second time interval;

a first mixer having a signal input coupled to the first output of the baseband interleaver, a signal output, and a LO input;

a second mixer having a signal input coupled to the second output of the baseband interleaver, a signal output, and a LO input;

a local oscillator interleaver configured to receive a plurality of LO signals corresponding to a plurality of phases, and generate a first interleaved LO signal that is coupled to the LO input of the first mixer and a second interleaved LO signal that is coupled to the LO input of the second mixer, the first interleaved LO signal having a first phase during the first time interval and a second phase during the second time interval, and the second interleaved LO

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signal having the second phase during the first time interval and the first phase during the second time interval; and

a combiner coupled to the signal outputs of the first and second mixers.